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A PROPOSAL FOR SERVICES FOR PREPARATION OF AN ENVIRONMENTAL ASSESSMENT

URBAN/MUNICIPAL
CA4ONHBL P97
87 P625

A Proposal for Services for preparation of An Environmental Assessment under the Environmental Assessment Act of Ontario

for
the Hamilton Waterfront Masterplan

for
The City of Hamilton

by
B.A.R. Environmental

July 1987

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GOVERNMENT DOCUMENTS

B.A.R. ENVIRONMENTAL
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I. Introduction

B.A.R. Environmental (formerly Booth Aquatic Research Group Inc.) prepared for the City of Hamilton in June 1986 an application for exemption from the Environmental Assessment Act under Section 29. In May 1987 the exemption was denied by the Minister of the Environment. The reason for doing so was that controversy over the implementation of the Masterplan remained which could not be resolved through the planning process had exemption been granted.

In June of 1987 we were asked by the City of Hamiltion to meet with the Environment Assessment Branch and City officials to discuss future policy for persuing approval under the Environmental Assessment Act. The schedule for completion of application under the Act which was suggested at that meeting is attached in Section 3. Because of our extensive familiarity with the technical details of the project through preparation of the original technical document and our involvement with the project since its early planning stages we were subsequently asked by the City to submit our cost proposal for completion of this project. The following sections describe the approach which was suggested by the Environmental Assessments Branch and division of tasks among our own staff and specialist subconsultants.

II. Approach

The Environmental Assessment process is set up to ensure that appropriate planning guidelines are followed and that safeguards are in place to protect the natural, physical and social environment. Alternatives that were considered during the planning process and reasons for their elimination must be described. There must be opportunity for consultation with the public regarding their opinions. Of prime importantance is the need to show that all the environmental impacts of the project have been evaluated and that they can be successfully mitigated. Failing mitigation it must be shown they can be minimized to a point where the value of the poject outweighs the remaining impacts.

The approach suggested by the Ministry of the Environment, Environmental Assessment Branch (EA Branch) is one of open consultation and cooperation. We shall develop each chapter of the assessment document, building on the background of the application for exemption document, in close consultation with the appropriate agencies. Draft chapters will be circulated for their approval as they are ready, prior to preparing the final document. In the interest of time, we will not circulate a complete draft report but will ensure that the draft chapters meet approval at the agencies. We also propose to keep the public informed of our progress by issuing a schedule and a description of our progress and encouraging their comments.

The City should be aware of the concurrent project on the former Lax Property which may affect this Environmental Assessment. The removal and clean up of industrial waste from the property is not yet complete. Once the clean up is completed (estimated by spring 1988) the City is required to apply to the Minister of the Environment for permission under Section 45 of the Environmental Protecion Act for proceeding with development of a property on which waste has been deposited. This request must be accompanied by evidence that there is no danger of contamination of water or the overlying air. The field investigaton for this report will commence once the site is cleaned up and applicaion for approval under Section 45 will be made concurrently to the request for approval of the environmental assessment. As much of the evidence and background research for the EA Report and the Section 45 Report are similar it was deemed most efficient to carry them out together.

The schedule and tasks outlined below describe the process we envisage as being most effective to accomplishing the City's objective: obtaining all appropriate environmental approvals for proceeding with the Waterfront Masterplan. If we are successful at following our proposed schedule we anticipate completion of the process by January 1989.

SCHEDULE FOR WATERFRONT MASTERPLAN E.A.

DESCRIPTION	START	COMPLETE
BAR submission of proposed workplan to the City	June 87	July 10, 87
City committees approve workplan & fees	July 10, 87	July 30, 87
Distribute schedule and workplan to the public	July 30, 87	
Consultation period	Aug 1, 87	Oct 1, 87
(INDUSTRIAL WASTE REMOVAL)	Aug 1, 87	April, 88
Tender Noise study	Aug 15, 87	Sept 30, 87
Traffic & Economic & Dredgate studies	Aug 1, 87	Oct 1, 87
Noise study	Oct 1, 87	Nov 15, 87
Prepare chapters for review	Sept 15, 87	Nov 30, 87
Review of draft chapters	Nov 1, 87	Dec 31, 87
Prepare E.A. report	Jan 1, 87	Feb 1, 88
Section 45 studies & report	April, 88	Oct, 88
City approval process	Feb 1, 88	March 1, 88
Submit to the MOE and the public	March 1, 88	
Government official review	March 1, 88	Sept 1, 88
Public review of government review document (30 days)	Sept 1, 88	Oct 1, 88
Minister's decision on hearing	Oct 1, 88	Oct 15, 88
Set up hearing	Oct 15, 88	Oct 30, 88
Public hearing	Nov 15, 88	
Hearing report	Nov 30, 88	
Minister's decision	Jan 1, 89	

IV. TASKS

The following sections describe in brief the variety of tasks which have been delineated in consultation with the E.A. Branch of the Ministry of the Environment. Many of the tasks require the expertise of consultants specializing in particular fields. Some of special studies will be subcontracted through B.A.R. Environmental while others will be tendered through the City of Hamilton.

1. Public Relations

The public will be informed of the City's approach through a public information release explaining the strategy for the development of the Environmental Assessment. A workplan and timetable will be outlined. The document will also indicate to the public where their opportunities will lie for comments and discussion of the Masterplan.

Throughout the E.A. process the public will be kept informed of the progess and results as they become available through such avenues as press releases and/or information circulars. While the information for these releases will be prepared by B.A.R. we will rely on the City staff to expidite their distribution.

2. Project Coordination and Liaison

Gillian Booth of B.A.R. Environmental will be the project coordinator and the key liaison between the City of Hamilton and the various government agencies. She will be responsible for keeping the City informed of progress by way of monthly progress reports and regular meetings with City staff. B.A.R. Environmental staff will manage and produce the biophysical studies required for the Environmental Assessment. These include the dredgate and noise studies and the technical work required for acquiring approval under Section 45 of the Enviornmental Protection Act and consultation with the 35 other government agencies involved. Joe Berridge and his staff will coordinate the economic and traffic studies as these investigatons require input and direction from the planning team. One of the responsibilities of Berridge Lewinberg will be to produce a detailed land use map of the area to aid the traffic and economic studies.

3. Traffic Study

M.M. Dillion and Associates will examine the implications of alternative masterplan scenarios on neighbourhood traffic. Neighbourhood traffic volumes will be determined and public transit usage will be identified. Traffic assignment will be determined with and without the proposed Perimeter Road and/or Waterfront Drive. The impact of change in traffic volume on local streets and regional roads to existing transit routines will be assessed. Mitigation in terms of changes to local street operations, park and waterfront access, perimeter road staging

and park operations will be examined. M.M. Dillion has prepared the Northend Neighbourhood traffic study for the Perimeter Road feasibility study and therefore are very familiar with the background information to the study.

4. Noise Study

Noise sensitive locations including residential areas, special parks and institutional land uses will be identified initially. Subsequently, existing ambient sound levels will be established. The potential noise impact due to activities within the proposed development, including IMAX theatre, traffic, etc., on the noise sensitive locations will be assessed and mitigation measures proposed. The service will be subcontracted to an engineering firm specializing in noise control studies.

5. Dredgate Review

The dredging and disposal plan as outlined in the Application for Exemption requires further review based on additional sediment core analyses from Macassa Cove. Design plans for mitigation measures will be finalized through subcontracting to M.M. Dillion Ltd., an engineering firm which is already contracted to design dredgate disposal options for the south side of the Lax Property along the edge of the proposed perimeter road. The Ministry of the Environment will be involved in review and approval of final design plans for mitigation measures and dredgate disposal.

6. Section 45

Prior to commencement of development on the former Lax propoerty the City must obtain approval under Section 45 of the Environmental Protection Act from the Ministry of the Environment for development of a site which has received waste. The application must show that the property is safe for further development. The potential for release of toxics from the site after it has been cleaned up will be determined through several specialized studies:

1) A hydrological assessment will be conducted to determine the flux of groundwater reaching the nearshore water. Metal contaminants, organic contaminants and standard parameters will be analysed in the groundwater. An estimate of the impact of any contaminated geoundwater on the nearshore Harbour environment will be determined and contingency plans will be developed to be avainable in the event of future evidence of contamination. Additional piezometers will be constructed on the property to allow future monitoring of the groundwater.

2) A magnetometer survey will be conducted over the property to identify whether any buried metal containers remain after the remediation of the site. A cursory survey of the site in the summer of 1986 found several anomalies, all of which were found to be metal scrap discarded from the steel yards. A more complete survey is required to demonstrate the absence of any

drums of contaminated liquids.

3) An atmospheric screening of the gases emitting from the site is required to show that their are no noxious gases which are being released from buried material on the site. An environmental health appraisal will be made in light of the data which are collected.

4) The Ministry of the Environment has requested that the City conduct a visual underwater inspection of the nearshore sediment to determine whether there are additional pockets of industrial waste below the waterline. If so, then these will also have to be removed.

These services will be subcontracted or put out to tender as the City directs.

Based on existing and newly collected data, an assessment will be made of the environmental impact of the site both in its present state and after development. Construction design details for the dredgate disposal plan and future monitoring programs will be provided. Close liaison with the Ministry of the Environment will be maintained during preparation of the application for approval under Section 45.

7. Monitoring Plan Development

The application for exemption outlined a monitoring plan which was developed in consultation with the Ministry of the Environment. The existing nearshore water chemistry and groundwater monitoring program for the former Lax property will be elaborated on to ensure early detection of any leachate contaminating the groundwater in the property or seeping into the Harbour. The monitoring program will cover four phases; pre-construction, waste disposal, dredging, and construction. The monitoring program will be developed in accordance with the program outlined in Appendix 3 of the EA Exemption Application report. The Ministry of the Environment Hamilton Regional office, Ministry of Natural Resources and Hamilton Conservation Authorities will be approached for approval of the monitoring program and possible assistance to the City for implementation of the monitoring program.

8. Regional Economic Study

CMP/Brarnard Management Consultants will be asked to investigate the regional economic impact of various attraction alternatives for the Masterplan. Alternative scenarios will be identified in consultation with Berridge Lewinberg and the City. The scenarios will then be examined to determine the costs and benefits of developing each of these in the context of the Masterplan. They will identify the market support for each scenario to estimate whether appropriate target markets exist to justify each option. The costs and returns, in terms of employment and taxes, of both the construction and operational phases will be determined. The

impacts on existing local facilities will be taken into account. Finally they will draw conclusons as to the option mix of scenarios based on the jobs created, the costs to the City, the taxes generated and the estimated market draw and consequent attendance figures.

9. Harbour Commission Liaison

The Hamilton Harbour Commission objected to the application of exemption for the Waterfront Masterplan on grounds of some technical concerns and planning issues. The technical concerns can be addressed quickly. The planning issues however are outside the mandate of the current E.A. application and must be addressed by the City Planning and Legal Departments. Gillian Booth and Joe Berridge will be available to assist in the discussions with the Harbour Commission as required.

10. Other Agency Liason

Throughout the Environmental Assessment Process various agencies, such as, Ministry of the Environment, Ministry of Natural Resources and Conservation Authorities, in addition to City of Hamilton officials, Harbour Commission and the public, will be approached to review and approve sections of the Environmental Assessment report in relation to their expertise and direct involvement with the various sections. Consultation at this stage is intended to identify and solve outstanding concerns prior to final submission of the report to the Environmental Assessment Branch and the public.

11. Environmental Assessment Report Preparation

Once all the individual sections have been circulated and approved we will compile the report into a final complete document for submission to the City of Hamilton. Once approved by the City Council B.A.R. Environmental will have 200 copies printed for submission to the Ministry of the Environment and for distribution to the public.

12. Consultation with Environmental Assessment Branch

Constant communication with the Environmental Assessment Branch will help to ensure that the requirements of the Act are met. They will be kept informed of progress and will be asked to review sections as they are developed.

13. Public Hearing

A public meeting will be coordinated and prepared for the presentation of the Environmental Assessment report. Minutes of the public meeting will be included in the final Environmental Assessment report.

A public meeting is not mandatory under the Environmental Assessment Act unless the Minister deems that sufficient concerns

are presented by the public and government review process to warrant such a meeting. Dur to the nature of th4e project and the desire of the City of Hamilton to follow an open public involvement process it seems prudent to incorporate a public meeting into the schedule.

VI. PERSONNEL

Gillian Booth, a principal of B.A.R. Environmental, will be project manager for this work. She has supervised the environmental work for the Hamilton Waterfront since its inception and is therefore familiar with the environmental and planning issues critical to both the waterfront project and to the environmental assessment report. Gillian will coordinate the individual project managers of each aspect of the environmental assessment and will provide the key liason with the City of Hamilton. Her career in environmental consulting began in 1975 working for the World Bank in East Africa on deveolpments of new towns for housing squatters. In 1981 she founded B.A.R. Environmental to pursue practical solutions to environmental problems in Ontaro.

Isobelle Gray, an Environmental Limnologist with B.A.R. Environmental, will coordinate the dredgate disposal review and the various studies for the approval under Section 45 of the Environmental Protection Act. She will also develop the monitoring plan development. She joined B.A.R. Environmental in 1987 after five years as a limnologist with the federal government at the Canada Centre for Inland Waters. In recent work involving Hamilton Harbour, Isobelle evaluated oxygen models for the Harbour as part of the federal efforts towards remedial action. Some of Isobelle's other lake restoration projects have focussed on such problems as macrophyte and phytoplanton control.

Christopher Wren, an Environmental Biologist and Toxicologist with B.A.R. Environmental, will provide expertise regarding fish and wildlife aspects of the project. He joined B.A.R. Environmental in 1987 after completing two postdoctoral fellowships on environmental chemistry and wildlife toxicology.

Joe Berridge, a principal of Berridge Lewinberg Associates, and his staff will be working closely with B.A.R. Environmental and the City. During the Environmental Assessment process Berridge Lewinberg will guide the development of the Masterplan as necessary. While with Coobes/Kirkland/Berridge, Joe was instrumental in developing the Waterfront Masterplan for Hamilton Harbour and is therefore familiar with the planning and design of the waterfront project. Joe's career has focused on the resolution of the complexities of downtown and waterfront planning and development. From 1973-78 he worked as a manager in the City of Toronto's Planning and Housing Departments. Prior to founding Berridge Lewinberg Associates with Frank Lewinberg in 1986, he was a partner in the firm of Coombes/Kirkland/Berridge for eight years.

SCHEDULE OF TIME AND COSTS:

Task #	Task	- Time Alloted (in Days) - Booth	Gray	Wren	BAR Staff	Berridge	B/L Staff	Cost of Fees	Expenses	Cost of Studies	TOTAL COST
1	Public Relations	1	0	0	3	1	5	$4,690	$3,000		$7,690
2	Liaison with City of Hamilton	15	0	0	0	7	0	$13,920	$3,000		$16,920
3	Traffic Study	1	0	0	0	1	2	$2,440	$200	$20,000	$22,640
4	Noise Study	2	0	0	0	1	2	$2,920	$200	$20,000	$23,120
5	Dredgate Study	1	5	0	2	0	0	$2,980	$500	$13,000	$16,480
6	Section 45 Studies	2	20	0	4	0	0	$9,960	$200	$65,000	$75,160
7	Monitoring Plan Development	0	5	0	0	0	0	$2,000	$200		$2,200
8	Economic Study	2	0	0	0	1	4	$3,920	$200	$30,000	$34,120
9	Harbour Commission Liaison	1	0	0	0	1	0	$1,440	$300		$1,740
10	Other Agency Liaison	1	4	4	1	0	2	$5,130	$500		$5,630
11	E.A. Report Preparation	10	10	1	0	1	2	$11,210	$6,000		$17,210
12	Consultation with E.A. Branch	4	1	0	0	1	0	$3,280	$200		$3,480
13	Public Hearing	2	2	0	5	2	5	$7,430	$4,000		$11,430
	TOTAL DAYS	42	47	5	15	16	22				
	Daily Fees	$480	$400	$450	$250	$960	$500				
	TOTAL COSTS							$71,320	$18,500	$148,000	$237,820

B.A.R. ENVIRONMENTAL

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THE COMPANY

B.A.R. Environmental is a small group of environmental and aquatic scientists. Our emphasis is on producing high quality work based on sound scientific judgement.

B.A.R. Environmental professionals are experienced in working with both the government and the private sector. Equipment for aquatic biological and chemical assessment is available as required for specific projects. We are able to offer experience and expertise in program design, management of large-scale programs including data analysis and interpretation, and the flexibility to work with professionals from a variety of disciplines. Our associations with other scientists allow us to call on specific expertise when projects warrant it.

Familiarity with the requirements for environmental assessment at all levels of government allows B.A.R. to act efficiently in guiding projects through environmental legislation requirements. Experience has shown that by working with the project managers in the preliminary planning stages, we can offer guidelines to circumvent many of the potential problems that can arise later in a project.

REPRESENTATIVE ASSIGNMENTS

BEATON FARM DEVELOPMENT
Bramalea Limited/General Motors Limited
1987

We worked as part of an interdisciplinary team of planners (Berridge-Lewinberg) and engineers (Totten Sims Hubicki) on the development of a prestige business park to include a new head office for General Motors. The site adjoined Lake Ontario, Darlington Provincial Park and Second Marsh, a class one provincial marshland. Our prime concerns were protection of the Marsh, the Park and McLaughlin Bay of Lake Ontario, and the associated water quality and wildlife, particularly waterfowl. We suggested mitigating measures for stormwater management and reviewed the stormwater management plan produced by Totten Sims Hubicki. The high public profile of Second Marsh resulted in consultation with active interest groups throughout the planning process. A report was prepared highlighting the critical environmental issues and suggesting practical measures to minimize detrimental impacts on the neighbouring environments.

PALEOLIMNOLOGICAL INVESTIGATION OF PHYTOPLANKTON
Ontario Ministry of the Environment
1987

In association with the University of Toronto, B.A.R. is undertaking a paleolimnological investigation of recent changes in phytoplankton standing crop and relative blue-green algal abundance in Lake-of-the-Woods, Ontario.

FISHERIES ASSESSMENT IN GREAT LAKES AREAS OF CONCERN
Fisheries Branch, Ontario Ministry of Natural Resources
1986

B.A.R. is contracted to collect baseline fisheries information by electrofishing at selected areas throughout the Great Lakes Basin to provide information for the Remedial Action Planning Process.

IMPACT OF THERMAL DISCHARGE ON FISH POPULATIONS
Chapleau Co-Generation Ltd.
1986-92

B.A.R. is performing a multi-year study to determine the effect of a discharge of heated water on a fish community in the Chapleau River. B.A.R. designed an impact study to detect changes in the downstream fish populations and is also assessing potential impact through a bioassay exposure of sensitive life stages of walleye.

HAMILTON WATERFRONT ENVIRONMENTAL IMPACT STUDY
City of Hamilton
1986

An environmental impact study was prepared for submission to the Ontario Ministry of the Environment regarding a $40 million proposed waterfront development. Potential impacts included those from dredging polluted harbour sediments, removal of industrial waste material from the site, construction and operation of the recreational facilities. This study is an integral part of the International Joint Commission Remedial Action Plan for Hamilton Harbour.

DESIGN OF A RECREATIONAL LAKE WITH CHLORINATED SWIMMING AREA
City of Hamilton, in conjunction with Berridge Lewinberg Associates
1986

Specifications were prepared for a 5-acre lake to be built in a recreational urban park. A curtained off swimming area was suggested to allow creation of a swimming area which was economically feasible and met the standards required by the Province. The rest of the lake will be used for a pan-fish fishery and paddle boating.

NUISANCE BLUE-GREEN ALGAE
Ontario Ministry of the Environment
1986

An Unsolicited Proposal was funded to investigate and develop a method for prevention and mitigation of nuisance blue-green algal blooms in eutrophic lakes. A follow-up study was undertaken in association with Anthony Usher Planning Consultant to examine the socio-economic costs and benefits of mitigating techniques for controlling blue-green algal blooms.

EXPERIMENTAL LAKE NEUTRALIZATION
Ontario Ministries of Natural Resources and of the Environment
1981-1991

B.A.R. is responsible for the coordination and management of a ten year, multi-million dollar research program to evaluate the effects of neutralizing acidified lakes and lakes endangered by acidification.

We have designed and reviewed many related projects under this program. Fish population studies and fish toxicity studies are carried out in conjunction with extensive water quality work as the three major components of the program. Peripheral to these are examinations of the plankton and benthic communities, sediment chemistry and a variety of reports regarding the feasibility of different methods of liming lakes.

Additional contracts under the Experimental Neutralization Program which have been undertaken by B.A.R. are listed below.

Laundrie Lake Shoal Liming
Ontario Ministry of Natural Resources
1984-86

Five shoals in this partially acidic lake were covered with experimental plots of various grades of calcite gravel. Chemistry and *in situ* bioassays were used to determine the effectiveness of five treatments. It was seen that while some treatments are relatively ineffective, others can promote survival of lake trout eggs and fry which might otherwise succumb to acid stress. This project was one of several experimental liming projects carried out under the Ontario government's Experimental Lake Neutralization Program.

Trout Lake Liming
Ontario Ministry of the Environment
1984

Trout Lake was part of a long-term program to study the effects of liming on a non-acidic lake that was threatened with acidification from acid rain. The dynamics of liming were studied using models, prior to developing an implementation plan for liming Trout Lake. A Canso water bomber dropping a calcite slurry into the lake was found to be the most cost-effective and satisfactory method for this remote lake.

Bowland Lake Liming
Ontario Ministry of the Environment
1983

Bowland Lake, a 100 ha remote acidified lake north of Sudbury, was limed using 84 tonnes of dry, fine grained calcite dropped from a Canso water bomber. B.A.R. designed the specifications for the project including modelling the anticipated results using a Swedish developed model. This lake liming was studied as part of the Ontario government's Experimental Lake Neutralization Program.

Fish Stock Assessment
Ontario Ministry of Natural Resources
1983-84

An intensive research project was implemented under the COED-NEED program to investigate fish populations in three Ontario lakes. These lakes presently contain fish which may be under stress from acidification of their environment.

Littoral Zone Habitat Mapping
Water Resources Branch, Ontario Ministry of the Environment
1982

B.A.R. was contracted to map the littoral zone flora and fauna communities in two southern Ontario lakes. This provided a baseline description of the lakes for the purpose of an environmental assessment of major perturbations which were forecast.

project was funded by the City of Hamilton.

INVERTEBRATE IDENTIFICATION
Glenora Fisheries Research Station,
Ontario Ministry of Natural Resources
1985

Identification and enumeration of invertebrates from slimy sculpin stomachs and Shipek samples were undertaken. Results aided in defining sculpin seasonal food intakes and seasonal changes in biomass of invertebrates for a range of depths.

CREEL CENSUS IN CENTRAL ONTARIO LAKES
Acidification Study Group, Ontario Ministry of Natural Resources
1985

Several lakes in the Algonquin Region were investigated to document the effects of acidification on the success of anglers and the harvest of fish. Data entry and preliminary analysis were undertaken using the MNR Creesys computer program.

GIBSON INDIAN RESERVE ACIDIFICATION STUDY
Michael Michalski Associates
1985

A review of local and international literature on acidic precipitation was conducted with emphasis on issues relevant to the Gibson Indian Reserve. Programs were designed to assess the impact of acidic precipitation on the Reserve's aquatic resources.

ALGAE DATA ANALYSIS
Ontario Ministry of the Environment
1985

Five hundred lake-years of data collected by MOE districts were compiled and analyzed to determine any significant correlations between the physical characteristics of the lakes and the appearance of blooms of odour producing algae.

ENVIRONMENTAL ASSESSMENT OF PROPOSED AGRICULTURAL DRAINAGE
Cumming Cockburn & Associates
1984

An environmental appraisal of the effects of a proposed agricultural drain in the Kawartha Region of Ontario was conducted. Means of minimizing effects of drainage were also pursued. This project was funded by the Kawartha Region Conservation Authority.

FISHERIES ASSESSMENT IN CENTRAL ONTARIO LAKES
Acidification Group Study, Ontario Ministry of Natural Resources
1984

Several lakes in the Algonquin Region were investigated to document

the effects of acidification on fish populations. A detailed field report and preliminary computer analysis were provided to the Ministry of Natural Resources.

REVIEW OF DRAFT ENVIRONMENTAL ASSESSMENT FOR BRUCE ENERGY CENTRE
Canadian Environmental Law Association
1983-84

B.A.R. was retained to comment on the Draft Environmental Assessment of Ontario Hydro to develop an industrial complex adjacent to the Bruce Energy Centre. Impacts on terrestrial and aquatic ecosystems were addressed.

STORMWATER DRAINAGE REVIEW
Maple Leaf Estates
1983

A technical review was made of environmental assessment reports pertaining to the effects of stormwater damage from a new development on the ecology of Lake Simcoe.

HISTORICAL TRENDS IN LAKE ACIDIFICATION
Environmental Dynamics Section, Ontario Ministry of Natural Resources
1981-82

A two-part review was completed of biological and chemical research undergone in lakes in the acid sensitive regions of Ontario. The information was used to evaluate possible long term trends of lake acidification.

SPOF BOOKLET
Client Services Section, Ontario Ministry of Natural Resources
1981

A review was written of the Provincial Government Strategic Plan for Ontario Fisheries (SPOF). The project included the production of an information booklet for distribution to the public.

LAKE WHITEFISH POPULATION DYNAMICS
Ontario Council of Commercial Fishermen
1981

B.A.R. provided scientific assistance for a study of the population dynamics of lake whitefish in Bay of Quinte, Lake Ontario. The results of the study were used by the Provincial Government to make changes to the commercial fishing regulations in the Lake.

WALLEYE AND LAKE WHITEFISH STUDY
Glenora Fisheries Research Station
Ontario Ministry of Natural Resources
1981

A field program was initiated to examine lake whitefish and walleye

populations in the Bay of Quinte, Lake Ontario. Data were analyzed to determine possible changes in year-class strength in relation to decisions which were imminent regarding regulation of the fishery.

B.A.R. ENVIRONMENTAL

GILLIAN M. BOOTH

Environmental Biologist
Principal of B.A.R. Environmental

Bachelor of Arts
Queens University, 1974

Master of Science
University of Toronto, 1980

Early in 1981 Mrs. Booth founded Booth Aquatic Research Group Inc., since renamed B.A.R. Environmental. She has been actively involved in study design, coordination and report preparation for many of B.A.R.'s projects. Her background in environmental science and experience in the application of environmental regulations make her a useful member of inter-disciplinary teams.

Mrs. Booth has been actively involved in many projects concerned with the effects of acidic precipitation on Ontario's aquatic resources. As coordinator of a $5 million project for the Province of Ontario, Mrs. Booth is responsible for the logistics of design and implementation of a ten year Experimental Lake Neutralization Program. As the research for her Master of Science degree was centred on effects of acidification on fish eggs and fry, Mrs. Booth is specifically responsible for the bio-monitoring experiments that constitute about one third of the research program.

Other related projects have included research of documents from archival and government sources regarding acid sensitive lakes in Ontario for the Acidic Precipitation in Ontario Study and an acidification study undertaken for the Gibson Indian Band in central Ontario.

Mrs. Booth has developed expertise in the environmental assessment process and was involved in preparing the Class Environmental Assessment for Lake Neutralization, which required both technical knowledge about lake liming and a thorough understanding of environmental legislation in Ontario.

Recently Mrs. Booth has prepared the environmental assessment for a $40 million waterfront master plan for Hamilton Harbour on Lake Ontario. Working together with the project planners and engineers, Mrs. Booth coordinated participation from industry, public interest groups and staff of the Ministry of the Environment and the Ministry of Natural Resources in an active public consultation program. Mrs. Booth was also involved in the design of a contaminated fill management plan to deal with disposal of industrial waste which had been dumped on the waterfront property.

Examples of other projects in which Mrs. Booth has been involved are included in the company profile.

In 1979 Mrs. Booth completed a research program toward a Master of Science degree studying eight acid sensitive lakes in Ontario. She studied the effects of lake acidification on several species of fish. Laboratory studies on the details of acid induced mortality in fish eggs resulted in better definitions of the mechanisms of stress and gave her considerable experience in the techniques of spawning, hatching and rearing various fish species in culture conditions.

Prior to returning to graduate school in 1978, Mrs. Booth worked with Terraplan Kenya Ltd. in East Africa. This World Bank funded project was aimed at improving the living conditions of 80,000 squatters camped on the shores of the Mithari River in Kenya. Water quality of the river was seriously impaired and the resulting pollution posed a serious health hazard to the community. The inter-disciplinary team involved planners, engineers, architects and biologists working to upgrade the services available to the community.

Recent Publications and Presentations:

Booth, G.M., J.G. Hamilton and L.A. Molot. 1987. Whole-lake and shoal liming in Ontario: in situ bioassays and short-term biological and chemical changes. Water, Air, Soil Poll. in press.

Molot, L.A., J.G. Hamilton and G.M. Booth. 1986. Neutralization of acidic lakes: short-term dissolution of dry and slurried calcite. Water Research 20(6):757-761.

Booth, G.M. 1985. Liming Acidified Lakes and Rivers in Canada: Objectives and Strategies. Presented to Liming Acidic Waters Conference, Albany, NY, October, 1985.

Molot, L.A., J.G. Hamilton and G.M. Booth. 1984. Ontario's Experimental Lake Neutralization Project: calcite additions and short-term changes in lake chemistry. Proc. 3rd Ann. Conf. North Am. Lake Manage. Soc., U.S. Environ. Protect. Agency 440/5/84-001.

Booth, G.M. 1984. Biological effects of liming lakes. Presented to the Ministry of Natural Resources Policy Review Meeting in February, 1984.

Booth. G.M. 1982. A Perspective on Lake Neutralization in Ontario. Presented to the Canadian Society of Environmental Biologists in November 1982.

Booth, G.M. and C.I. Goddard. 1981. Strategic Plan for Ontario Fisheries: an Overview. Ontario Ministry of Natural Resources Report.

Affiliations:

American Fisheries Society
Canadian Society of Environmental Biologists
(Past Secretary, Ontario chapter)
Federation of Ontario Naturalists
North American Lake Management Society

B.A.R. ENVIRONMENTAL

ISOBELLE GRAY

Environmental Limnologist

Bachelor of Science
University of Windsor 1980

Master of Science
University of Windsor 1987

Mrs. Gray joined B.A.R. Environmental in 1987 after five years as a limnologist with the federal government at the Canada Centre for Inland Waters (CCIW).

While with CCIW Mrs. Gray gained valuable experience working with federal scientists examining environmental issues. She recently evaluated models predicting oxygen depletion in Hamilton Harbour as part of the federal efforts towards remedial action in the Harbour. Other projects involved lake restoration, focussing on such problems as macrophyte and phytoplankton control. Contamination of aquatic environments by toxic chemicals is a persistent problem in Canada; Mrs. Gray has examined lake plankton as carriers of toxic chemicals.

Mrs. Gray graduated magna cum laude with a degree in environmental biology. For her master of science thesis she researched environmental factors regulating phytoplankton populations in small ponds.

Publications and reports:

Gray, I.M. 1987. Nearshore and offshore differences in composition of phytoplankton in Lake Ontario. Can. J. Fish. Aquat. Sci. in press.

Murphy, T., I. Gray, H. Wong and L. Harris. 1987. Sediment phosphorus release reduced the effect of the Chain Lake water diversion. NWRI contribution #87-03.

Gray, I.M. 1985. The effect of temperature on phosphorus uptake kinetics by cladophora. DSS Contract 02SE KW 405-4-1341.

Gray, I.M. 1985. Temporal and spatial patterns of cladophora in Lake Ontario. DSS Contract 02SE.KW405-41341.

B.A.R. ENVIRONMENTAL

CHRISTOPHER D. WREN

Environmental Biologist and Toxicologist

Bachelor of Science, Marine Biology
University of Guelph 1977

Doctor of Philosophy, Zoology
University of Guelph 1983

Awards: Fellowship from Royal Norwegian Council for Scientific and Industrial Research: 1986-87
NATO Travel Grant: 1986-87
Ontario Graduate Scholarships: 1979-80, 1982

Associations: Wildlife Disease Association
Society for Environmental Toxicology and Chemistry
Canadian Society of Environmental Biologists
International Association of Great Lakes Research
Canadian Society of Zoologist
Federation of Ontario Naturalists
College of Biological Sciences Alumni Association, University of Guelph (Past-President 1984-85)

EMPLOYMENT HISTORY

1986-1987 Postdoctoral Research Fellow, Department of chemistry, University of Trondheim, Norway. Research: Environmental Chemistry

1985-1986 Self-employed, Environmental Consultant.

Interim lecturer in Natural Resources Policy, Department of Zoology, University of Guelph.

1983-July, 1985 Postdoctoral Research Fellow, Institute for Environmental Studies, University of Toronto. Research: Wildlife Toxicology

1978-1983 Engaged in Ph.D. research

University Laboratory Teaching Assistantships in the following courses:

Developmental Biology
Invertebrate Zoology
Limnology of Polluted Waters
Natural Resources Policy

Student Technician Positions

1978 Inorganic Trace Contaminants Section, Ministry of the Environment, Rexdale, Ontario.

1977 Department of Zoology, University of Guelph, (tuna physiology studies in Nova Scotia)

1976 Department of Fisheries and Oceans, Burlington, Ontario (oceanographic survey of Hudson Bay).

1975 Ontario Ministry of Natural Resources, Fisheries Unit, Port Dover, Ontario.

1975 Fisheries Research Board, St. Andrews, New Brunswick

PUBLICATIONS

Wren, C.D., D.B. Hunter, J.F. Leatherland and P.M. Stokes. 1987. The effects of Polychlorinated biphenyls and methylmercury, singly and in combination, on mink, 1: Uptake and toxic responses. Arch. Environ. Contam. Toxicol. (in press, accepted Sept. 1986).

Wren, C.D., D.B. Hunter, J.F. Leatherland and P.M. Stokes. 1987. The effects of Polychlorinated biphenyls and methylmercury, singly and in combination, on mink, 2: Reproduction and kit development. Arch. Environ. Contam. Toxicol. (in press, accepted Sept. 1986).

Wren, C.D., P.M. Stokes and K. Fischer. 1987. Mercury levels in Ontario mink and otter relative to dietary levels and watershed acidification. Can. J. Zool. (in press, accepted July 1986).

Wren, C.D., N. Cloutier, T.P. Lim and N.K. Dave. 1987. Ra-226 concentrations in otter (Lutra canadensis) trapped near uranium tailings at Elliot Lake, Ontario. Bull. Environ. Contam. Toxicol. (in press, accepted June 1986).

Wren, C.D. 1987. Toxic substances in furbearing animals. Chapter In Fur Management and Conservation in North America. M. Novak (ed) Ministry of Natural Resources and Ontario Trappers Assoc. (in press).

Wren, C.D. 1986. Metal accumulation and toxicity in wild mammals, 1: Mercury. Environ. Res. 40:210-244.

Wren, C.D., and H.R. MacCrimmon. 1986. Comparison of the distribution and accumulation of mercury in two adjacent freshwater ecosystems. Water Res. 20(6):763-769.

Wren, C.D. 1986. Mammals as biological indicators of environmental metal loading. J. Environ. Monitor. and Assess. 6:127-144.

Stokes, P.M., and C.D. Wren. 1986. Bioaccumulation of mercury by aquatic biota in hydroelectric reservoirs: A review and consideration of mechanisms. In Occurrence and Pathways of Lead, Mercury, Cadmium and Arsenic in the Environment. T.C. Hutchinson and K.M. Meema (eds), pp. 255-277. John Wiley and Sons Ltds. Toronto.

Wren, C.D. 1985. Probable case of mercury poisoning in a wild otter, Lutra canadensis , in Northwestern Ontario. Can. Field Naturalist. 99(1):112-114.

Wren, C.D. 1984. Distribution of metals in tissues of beaver, raccoon and otter from Ontario, Canada. Sci. Total Environ. 34:177-184.

Wren, C.D., and H.R. MacCrimmon. 1983. Mercury levels in sunfish (Lepomis gibbosus) relative to pH and other environmental variables of Precambrian shield lakes. Can. J. Fish. Aquat. Sci. 40:1737-1744.

Wren, C.D., H.R. MacCrimmon and B. Loescher. 1983. Examination of biomagnification and bioaccumulation of metals in a freshwater ecosystem. Water, Air Soil Poll. 19(3):277-292.

MacCrimmon, H.R., C.D. Wren and B.L. Gots. 1983. Mercury accumulation in lake charr (Salvelinus namaycush) in an undisturberd Precambrian shield lake. Can. J. Fish. Aquat. Sci. 40(2):114-120.

Wren, C.D. 1982. Potential effects of metals on benthic organisms after liming acid-stressed lakes. Water Poll. Res. J. Canada 17:149-151.

Wren, C.D., H.R. MacCrimmon, R. Frank and P. Suda. 1980. Total and methylmercury levels in wild mammals from the Precambrian shield area of south central Ontario. Bull. Environ. Contam. Toxicol. 25:100-105.

Papers Submitted for Publication

Wren, C.D., K.L. Fischer and P.M. Stokes. 1987. Levels of lead, cadmium and other elements in mink and otter from Ontario, Canada. Environ. Pollut.

OTHER REPORTS/PUBLICATIONS

Wren C.D. 1987. Contaminant Research in Canadian otters. I.U.C.N. Otter Specialist Group, Bulletin Number 2.

Wren, C.D. 1986. Occurrence and toxicity of metals in wild mammals: A literature review. Final report to the Canadian Wildlife Service, Ottawa, 275 pp.

Wren, C.D. 1986. A study of metal accumulation in wild mink and otter in Ontario relative to environmental loading and lake acidification. Final report to Canadian Wildlife Service, Ottawa. 240 pp. Contract No. KN107-5-4167.

Wren, C.D., P.M. Stokes, B. Hunter, and J. Leatherland. 1986. Effects of low dietary levels of PCB (Arochlor 1254) and methylmercury on mink reproduction. Report to National Research Council Canada, Ottawa. Contract No. OST84-00333.

Jones, M., G. Cunningham, D. Marmorek, P.M. Stokes and C.D. Wren. 1985. Mercury release in hydroelectric reservoirs. Final report to the Canadian Electrical Association, Montreal, Quebec. 125 pp.

Wren, C.D. 1984. The Institute for Environmental Studies. University of Toronto, Bull. Canadian Society of Zoologists 15:10-11.

Rogers, G. and C.D. Wren. 1984. Resources study of toxic elements in sport fishes of Pukaskwa National Park. Final report to Parks Canada, Cornwall, Ontario. 37 pp.

Wren, C.D. 1983. Examination of environmental factors affecting the distribution of mercury and other metals in Precambrian shield lake ecosystems. Ph.D. Thesis, University of Guelph, Guelph, Ontario. 170 pp.

MacCrimmon, H.R. and C.D. Wren. 1983 Biological influences on mercury uptake and storage within the aquatic ecosystems of Precambrian shield lakes. Phase Two- final report to the National Research Council of Canada. Ottawa. 135 pp.

PAPERS/ABSTRACTS PRESENTED AT CONFERENCES

Wren, C.D. and P.M. Stokes. 1986. Mercury release in hydroelectric reservoirs. Paper presented to Canadian Electrical Association. Harbour Hilton, Toronto, March 25.

Wren, C.D., D.B. Hunter and P.M. Stokes. 1985. Effects of methylmercury on mink: an integrated field and lab study. Paper presented at Sixth Annual Meeting, Soc. Environ. Toxicol. and Chem., St. Louis, Mo. November 9-12.

Wren, C.D. and P.M. Stokes. 1985. Facts and fallacies concerning mercury uptake in fish from acid stressed lakes. Poster, Internat. Sympos. on Acid Precipitation, Sept. 15-20. Muskoka, Ont.

Wren, C.D., P.M. Stokes and K. Fischer. 1985. Mercury levels in piscivorous furbearers relative to environmental loading and availability in Ontario. Poster, Internat. Sympos. on Acid Precipitation, Sept. 15-20. Muskoka, Ontario.

Wren, C.D. 1984. Potential effects of acid rain to wildlife and furbearing animals. Presentation to the Sudbury Trappers Association. June 24, Sudbury, Ontario.

Wren, C.D. and P.M. Stokes. 1984. Metal accumulation and potential toxicity to wild mammals in Ontario. Presented to the Royal Society of Canada peer review of the Federal Government of Canada research programs on Long Range Transport of Atmospheric Pollutants (LRTAP). Feb. 21-22. Toronto.

Wren, C.D. and H.R. MacCrimmon. 1983. Relationship of mercury levels in sunfish to environmental conditions of acid-stressed lakes. Presented at Canadian Society of Environmental Biologists Annual Meeting, Winnipeg. Manitoba.

Wren, C.D. and H.R. MacCrimmon. 1982. Growth rate and mercury levels in pumpkinseed sunfish relative to pH in south central Ontario lakes. Presented to Acid Rain workshop, Ontario Ministry of the Environment. Toronto, April 2-4.

Wren, C.D. and H.R. MacCrimmon. 1981. Distribution of metals in an aquatic ecosystem. Paper presented at the 8th Aquatic Toxicity workshop. University of Guelph, November 2-4.

Wren, C.D. and H.R. MacCrimmon. 1981. Mercury accumulation in Precambrian shield lake ecosystems relative to local environmental conditions. Presented at the Plains Aquatic Research Conference, Calgary, Alberta. August 25-26.

JOE BERRIDGE

Principal

Joe Berridge is a principal in the firm of Berridge Lewinberg Associates, with a background in the economic, design and implementation aspects of urban development. His work has focused on the resolution of the complexities of downtown and waterfront planning and development. He has produced a development strategy for the proposed national headquarters of the C.B.C. in Toronto, was deeply involved in Toronto's Harbourfront development and acted as planning coordinator for Olympia and York's World Financial Center in New York City.

Most recently he has been coordinating the design, planning and negotiation of the new North York City Centre development for the City of North York. Mr. Berridge was also the partner in charge of generating a new master plan for Downtown Buffalo, the waterfront master plan for Hamilton Ontario, and a development and design strategy for Victoria University in Toronto. His private development work has included the concept plan for the Toronto Brick Site, site planning advice for Torstar Ltd. and General Motors and the development plan for a major section of the New Jersey waterfront. He is currently responsible for coordinating the planning of the Penn Centre/Madison Square Gardens project in New York City.

Joe Berridge received his B.A. from the University of Sussex, U.K. and an M.A. from the University of Toronto. From 1973-78 he worked as a manager in the City of Toronto's Planning & Housing Departments. Prior to founding Berridge Lewinberg Associates with Frank Lewinberg, he was a partner in the firm of Coombes/Kirkland/Berridge for eight years.

Joe Berridge is a regular lecturer on urban design and development issues at Columbia University in New York and has served on an American Institute of Architects work teams reviewing the San Francisco downtown plan and the waterfront of San Juan, Puerto Rico. Recently he was appointed to the Advisory Committee of the National Capital Commission in Ottawa, and to the Mayor's Committee on Transportation in Toronto. In 1986 he served as a juror on the prestigious annual "Progressive Architecture" awards and on the Mississauga Urban Design Awards jury.

Berridge Lewinberg

EDUCATION

1969 - 1971	**University of Toronto** Toronto, Ontario M.A. Urban Geography
1965 - 1968	**University of Sussex** Brighton, U.K. B.A. Honours, Upper Second Class Geography and Social Studies

WORK EXPERIENCE

1986 - Present	**Principal** Berridge Lewinberg Associates
1978 - 1985	**Principal** Coombes/Kirkland/Berridge
1977 - 1978	**Project Coordinator** Frankel/Lambert Development City of Toronto Housing Department
1974 - 1977	**Program Manager** City of Toronto Planning Board
1973 - 1974	**Planner** City of Toronto Planning Board
1971 - 1973	**Economist** Ontario Ministry of Revenue
1968 - 1969	**Researcher** University of Sussex

LANGUAGES

Fluent French, and a working knowledge of German and Spanish

MAJOR PROJECTS

Penn Center/Madison Square Gardens, N.Y.C.
Planning Coordination, 1986 - 1987

Downtown Master Plan, Buffalo, New York
Comprehensive Master Plan, 1984-1985

G.M. of Canada Head Office, Oshawa, Ontario
Planning & Site Design Strategy, 1985-1987

Palisades Development, New Jersey
Development Strategy, 1984

Bridgetown Fishing Harbour, Barbados
Urban Design, 1980-1984

Hoboken, New Jersey
Waterfront Planning, 1986

Nassau Harbour Expansion, Bahamas
Urban Design, 1986-1987

World Financial Center, New York City
Development Coordination & Project Management
1981-1986

Canadian Broadcasting Corporation,
Broadcast Centre, Toronto
Urban Design & Development Strategy, 1980-1987

Hamilton Waterfront Master Plan
Waterfront Planning & Implementation, 1985 - 1987

Joe Berridge

North York Downtown, North York, Ontario
Design Coordination & Development Strategy, 1982-1987

9th Avenue Project, New York City
Approvals Coordination, 1985 - 1987

Toronto Harbourfront Corporation
Design Framework and Development Strategy, 1978-1986

Victoria University, Toronto
Design and Development Strategy, 1986

National Capital Commission, Ottawa,
Daly & Chambers Buildings, Development Planning, 1986 - 1987

Scarborough City Centre,
Progress/McCowan; Development Site Planning, 1987

Toronto Brick Site,
Site planning, 1985 - 1986

5000 Yonge Street,
Site Planning and Development Strategy, 1986

Kitchener Downtown
Urban Design & Development Strategy, 1985

Etobicoke City Center
Urban Design Guidelines, 1985

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